The Vanderbilt Perioperative Information Management System Forms Foundation for Outcomes Management

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Background. With the advent of managed care there has been increased interest in performing economic analysis in the healthcare environment. [1] Within the hospital, one of the most important sites for this type of investigation is in the operating rooms since they are centers of both high resource utilization and high revenue generation. As with many institutions, the informatics environment at Vanderbilt University Medical Center did not readily support this type of analysis. Specifically, cost and outcome information could not be associated across the continuum of care either by time period (preoperative, intraoperative, postoperative) or by careprovider group (surgery, anesthesiology, nursing). Over the past two years, the Vanderbilt Perioperative Information System (VPIMS)© has been developed in order to meet this need.

System Design. The Vanderbilt Perioperative Information Management System (PIMS)© is a comprehensive point-of-care relational database that supports the care documentation, financial, and quality improvement processes of the perioperative enterprise. The system consists of seven interactive software modules: Preoperative Evaluation, Patient Survey, Administrative Reporting, Intraoperative Anesthesia, Perioperative Clinical Nursing, Postoperative Patient Evaluation, and Quality Improvement All modules are written in Microsoft® (MS) Access®, that relate to a common Microsoft® SQL Server™ 6.5 database. It is the integration of these modules that provides the foundation for outcomes analysis and care improvement.

Patient testing economy and consistency is enabled by the tracking of testing practices compared to established clinical guidelines. Products of the Preoperative Module include a computer generated paper medical record Preoperative Evaluation History and Physical Report which serves as a common document for Anesthesiology, Surgery, and Nursing care providers. The Intraoperative Module is designed to collect all patient care data essential to empower the processes of intraoperative patient care documentation, supply and drug utilization, perioperative care improvement, and professional billing. A unique OR management screen allows the user to view the status of all patients throughout the immediate perioperative period and alerts caregivers to potential problems. Products of the Intraoperative Module include a summary Intraoperative Care Report for the patient medical record, and other reports which support pharmacy, technical, billing and care improvement processes. The Postoperative Modules coordinate the collection and reporting of data which supports quality improvement, risk assessment and modification, perioperative documentation surveillance and outcomes research programs. A variety of forms allow collection of data from multiple periods of patient care including: PACU, Phase II Recovery, Post-operative 24 Hours (inpatient and outpatient), daily postoperative (Perioperative Medicine and Acute Pain Services) and Remote Postoperative (patient discharge). Products of the Postoperative Module include department and institutional Quality Improvement Reports, Patient Satisfaction Survey Reports, Post-operative Visit Notes, Acute Pain and Perioperative Medicine Service Notes, Hospital Patient Acuity Reports, and other specific research project directed reports.

PIMS data entry employs the advantages of pen-based computing. Data is entered by the user at the point of care via wireless touchscreen tablets (Cruisepad®, Cruisepad Technologies, Inc.) to a dual-Pentium® server running Microsoft NT® 3.51 operating system.

Results. The PIMS database has been implemented in modules beginning in the 3rd quarter of 1996 with the preoperative module and postoperative modules. Baseline and outcomes data has been collected for approximately 8000 patients in the first 6 months of use. The Intraoperative modules are undergoing beta-testing with full implementation anticipated by the 3rd quarter of 1997. The system has successfully achieved the goals of care documentation with the production of the required medical records reports. The system has been used to perform economic analysis of a Preoperative Testing Guidelines Program. Analysis of costs related to specific perioperative outcomes is ongoing.

Conclusions. There is an increasing need for perioperative clinical information systems to perform the analysis required for successful outcomes management programs. Comprehensive, fully integrated systems can be developed using "off-the-shelf" software packages which can meet the care documentation, quality improvement, and economic analysis needs of an Operative Service Center.

References

1. Garnick DW, Hendricks AM, Comstock CV, Pryor DB. A Guide to Using Administrative Data for Medical Effectiveness Research. The Journal of Outcomes Management, 1996; 3(1): 18-23.

1091—8280/97/$5.00